alaska brain injury network

Working With Individuals With Brain Injury

Being Part Of The Team

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Care Coordinator Connections

My Intention For The Next 60 Minutes

Help you:

- Understand the basics of brain injury
- Recognize it when you see it
- Know the basics of treatment
- Understand how to better work with individuals with Brain Injury

Who Is This Guy and Why Is He Here?

Naturopathic Physician

Lots of Patients with Brain Injury

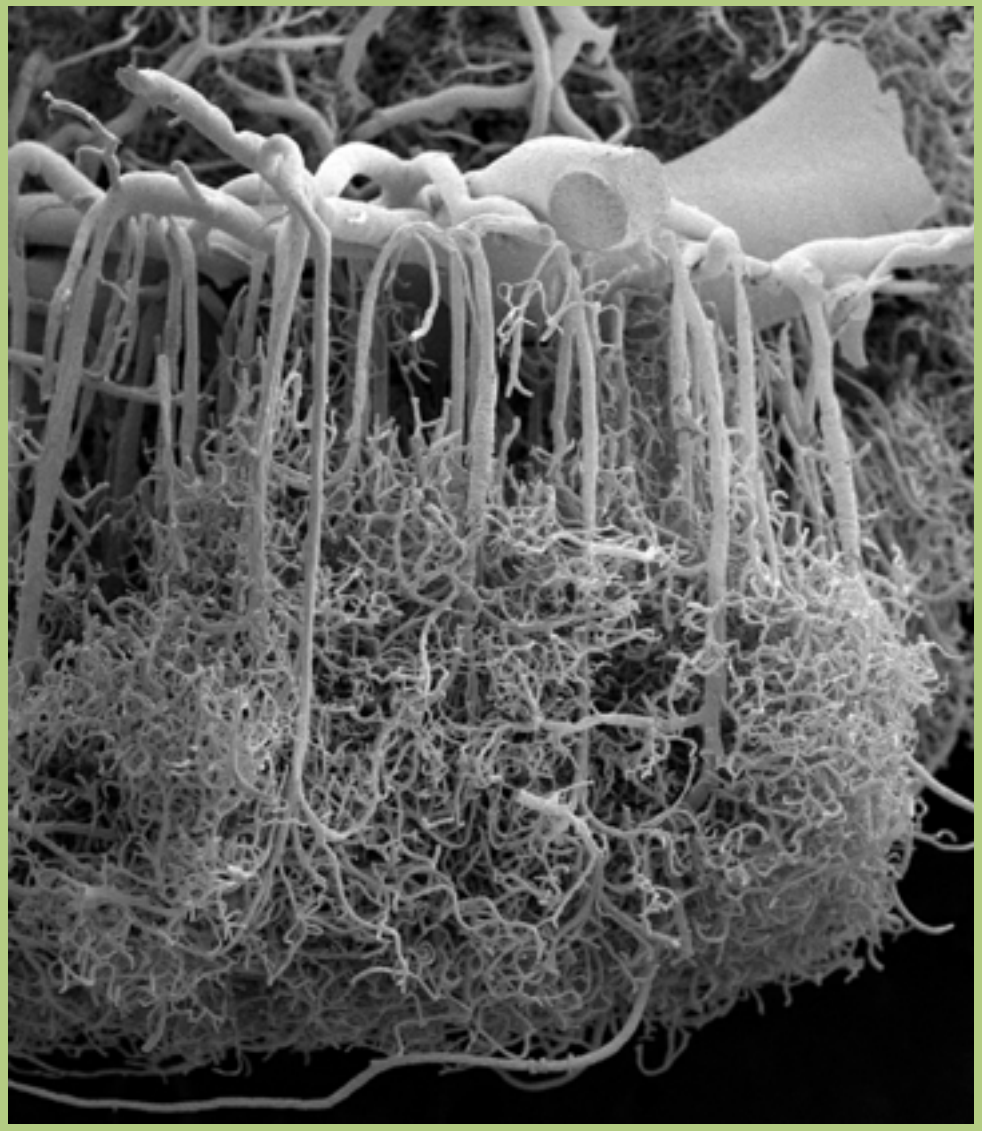
Board Member Alaska Brain Injury Network

Brain injury survivor

Team Player

Brain injury advocate

Brains Are Beautiful



Overview

- What is brain injury?
- Why Worry About Brain Injury?
- Myths and misconceptions about people with brain injury
- Brain Basics
  - Important physiology and anatomy
  - Neuro-plasticity
- Brain Injury
  - Mechanisms of Injury – The Many Ways to Hurt Your Brain
  - How Do You Know if Someone Has a Brain Injury? - Symptoms!
  - What About Treatment?
- Working With Brain Injured Individuals (putting it all together)
  - Person centered planning with team support
  - The community rehab model

What is Brain Injury?

What is Brain Injury?

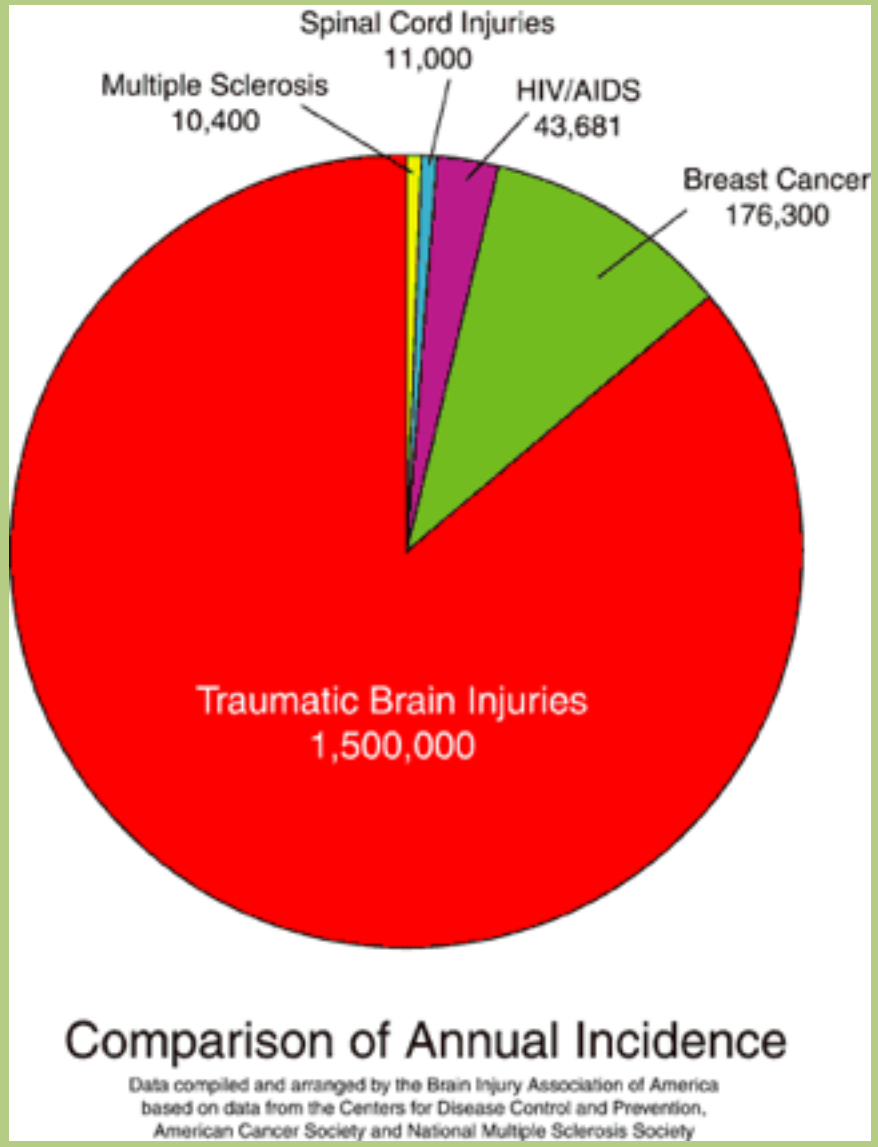
- Damage to the brain that results in impairments in physical, cognitive, speech/ language and/or behavioral functioning.
- We are not addressing diseases such as Alzheimer's or Multiple Sclerosis in this training.

What is Brain Injury?

- We are focusing on two basic kinds:
  - Traumatic brain injury (TBI)
    - Non-degenerative
    - Non-congenital
    - Insult to the brain from an external mechanical force
  - Acquired Brain Injury (ABI)
    - Occurs after birth
    - Not congenital or genetic
    - Can be caused by strokes, tumors, anoxia, hypoxia, toxins, degenerative diseases, near drowning etc
    - Not necessarily caused by an external force

Why Worry About Brain Injury?

Why Worry About Brain Injury?



Population of AK in 2014: 736,732

Rate of TBI in Alaska

- There are an estimated 10,000 Alaskans living with disability due to brain injury.
- Each year, 800 Alaskans are hospitalized and 150 Alaskans die.
- An estimated 38% of hospitalizations result in permanent disability.
- An estimated 247 Alaskans become permanently disabled due to TBI each year

Why Worry About Brain Injury?

- Brain Injury is a chronic disease with life-long impacts
- Because unlike most other disabilities, brain injury can get better over time with treatment
- People with brain injury can become un-disabled and return to work/life/play in many cases
- If we don't look for brain injury, we will never find those people and help them
- There are many obstacles to identifying folks with this often invisible disability.

Myths And Misconceptions About Brain Injury

Myths and Misconceptions

- Brain injury is difficult to understand
  - People often “look fine”

Myths and Misconceptions

- Brain injury looks like lots of other things
  - Mental illness - depression schizophrenia, bipolar etc
  - Behavioral problems and even criminality
  - Learning disability
  - Homelessness
  - Substance abuse
  - Dementia to include alzheimer’s disease

Myths and Misconceptions

- Brain injury is not a big deal
  - A physical injury can pale in comparison to a brain injury
  - Brain injury gets very little recognition
  - Huge numbers of people impacted
  - The fall from the top to gutter is very quick for many

Myths and Misconceptions

- Brain injury is permanent
  - Brain injury is considered a chronic illness
  - People with brain injuries can improve with treatment
  - Most brain injuries are mild and people can recover to former levels of function

Patient's General Condition on Discharge

Condition	Frequency	%
Good, Return to Previous Level of Function	861	28
Temporary Disability, Expected to Return to Previous Level of Function	1111	36
Moderate Disability with Self Care	133	4
Severe Disability, Dependent	155	5
Persistent Vegetative State	4	.1
Unknown	825	27

Myths and Misconceptions

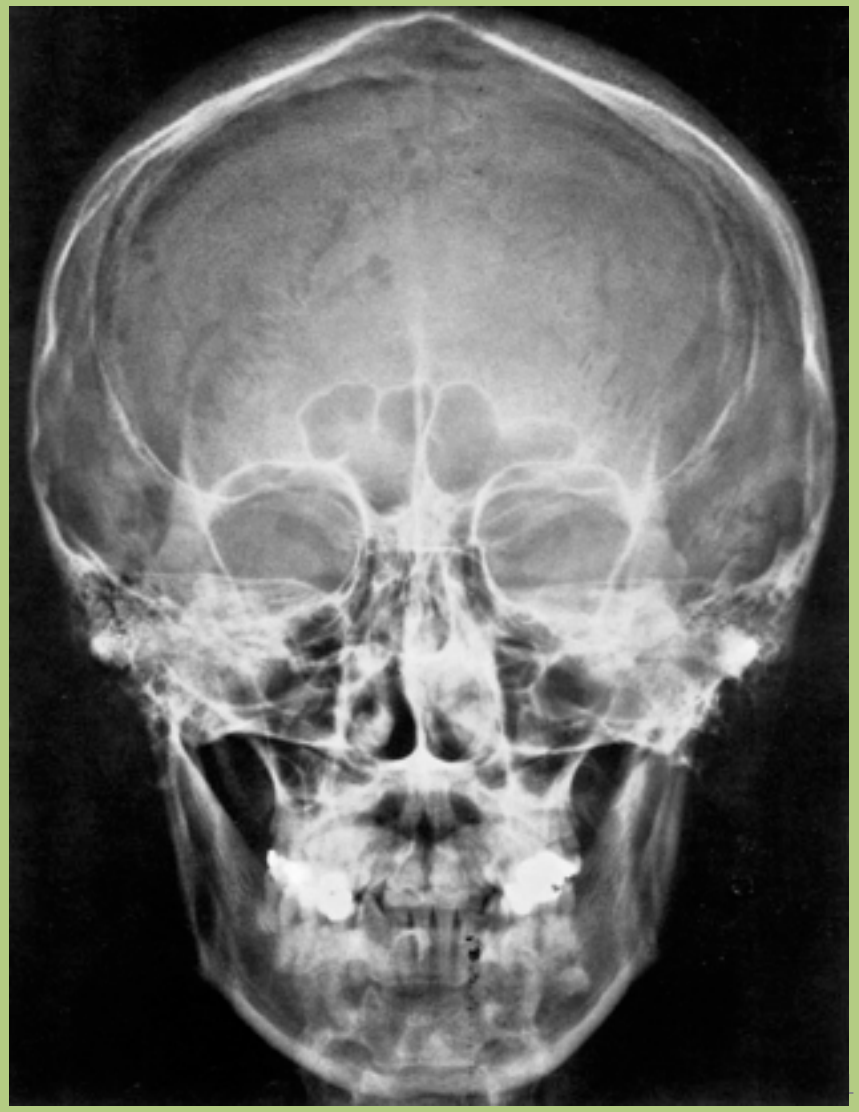
- Brain injury totally changes someone
  - After acute recovery, most people will be who they were - maybe even more so!
  - Old “disabilities” or struggles may return
  - Suppressed behaviors may surface

Myths and Misconceptions

- A concussion or “getting your bell rung” is not really a brain injury
- You have to hit your head to get a brain injury

Myths and Misconceptions

Which Brain Injury is Worse?

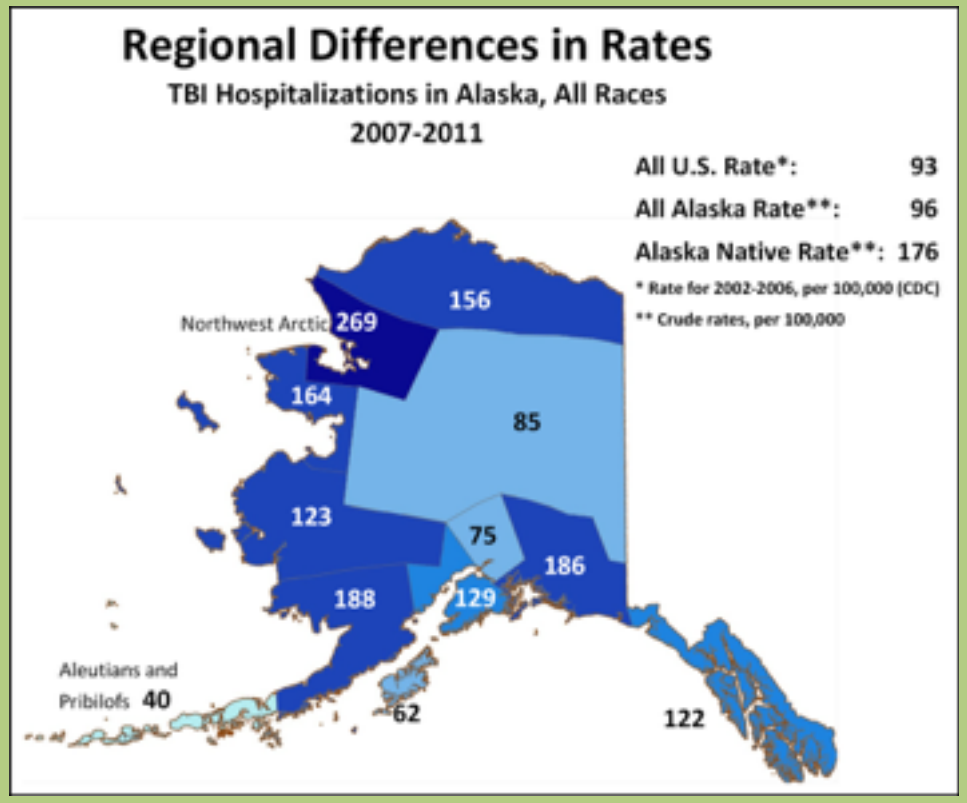


Myths and Misconceptions

- Brain injury happens to big city people mostly

Region of Patient Residence

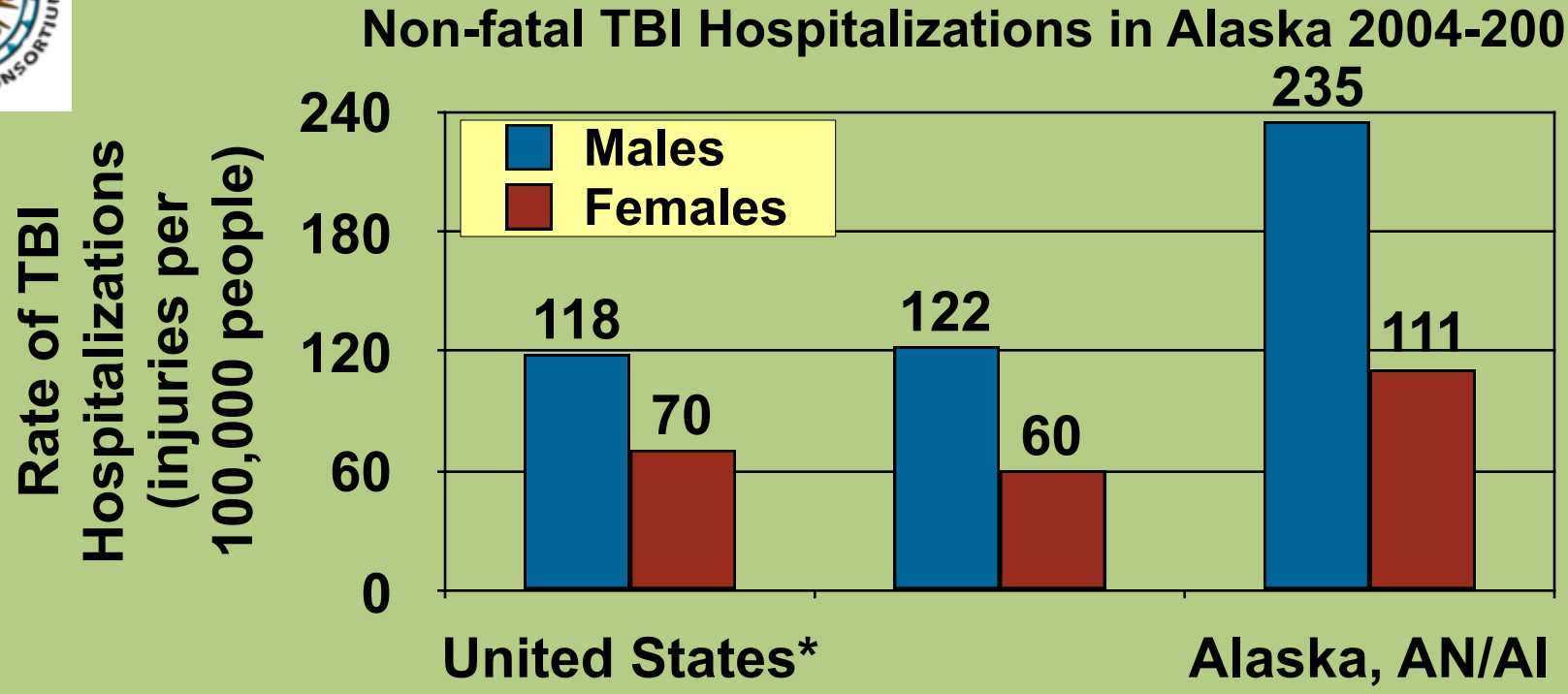
Non-fatal TBI Hospitalizations in Alaska 2007-2011



Myths and Misconceptions

- Men and boys get more brain injuries because they do stupid things

The Gender Gap



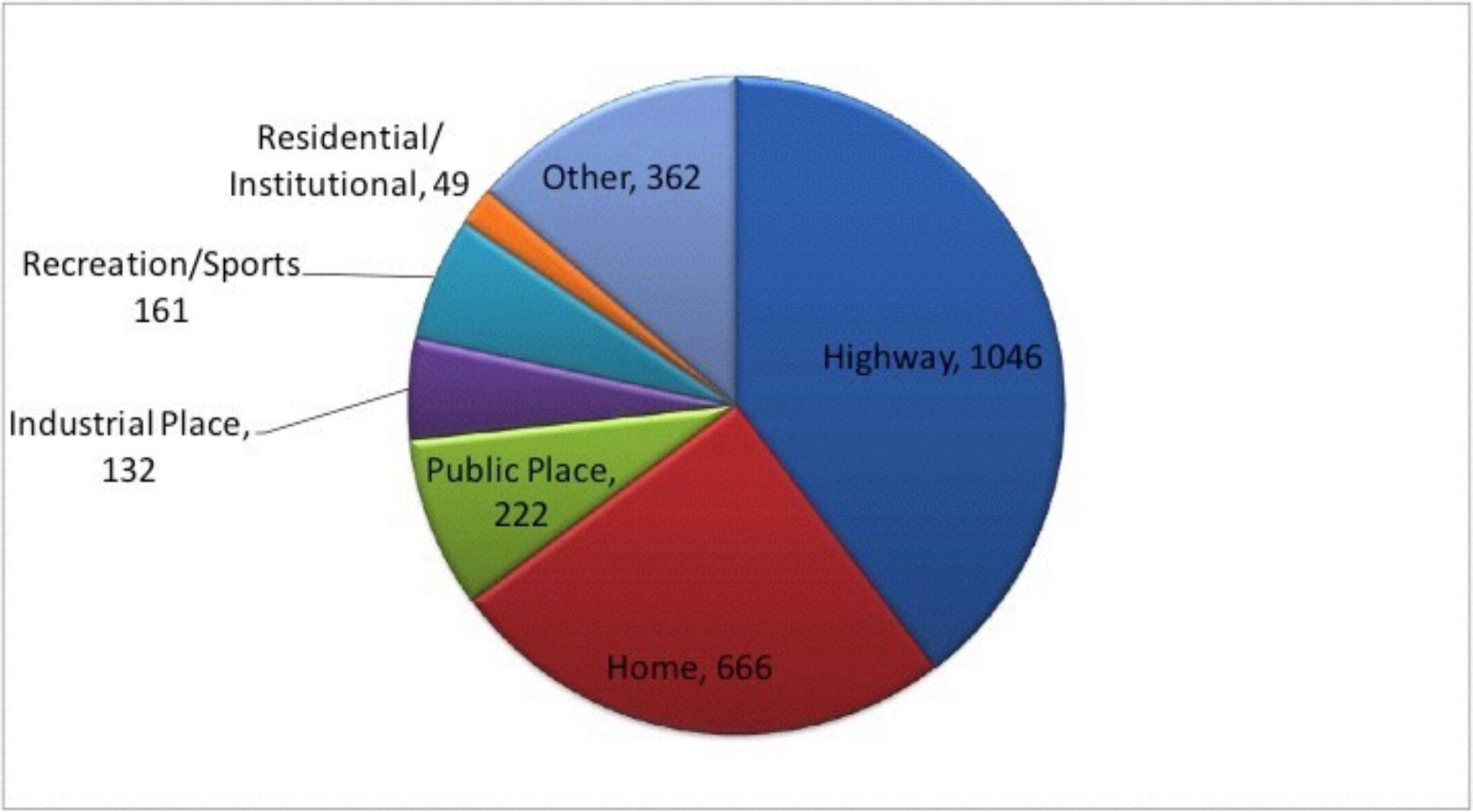
* US data for 2002-2006, per CDC

Myths and Misconceptions

- Home is the safest place to be to avoid TBIs
- Wearing a helmet prevents brain injuries
- Brain injuries are mostly from car crashes

Specific Places of Occurrence

Non-fatal TBI Hospitalizations in Alaska
2004-2008

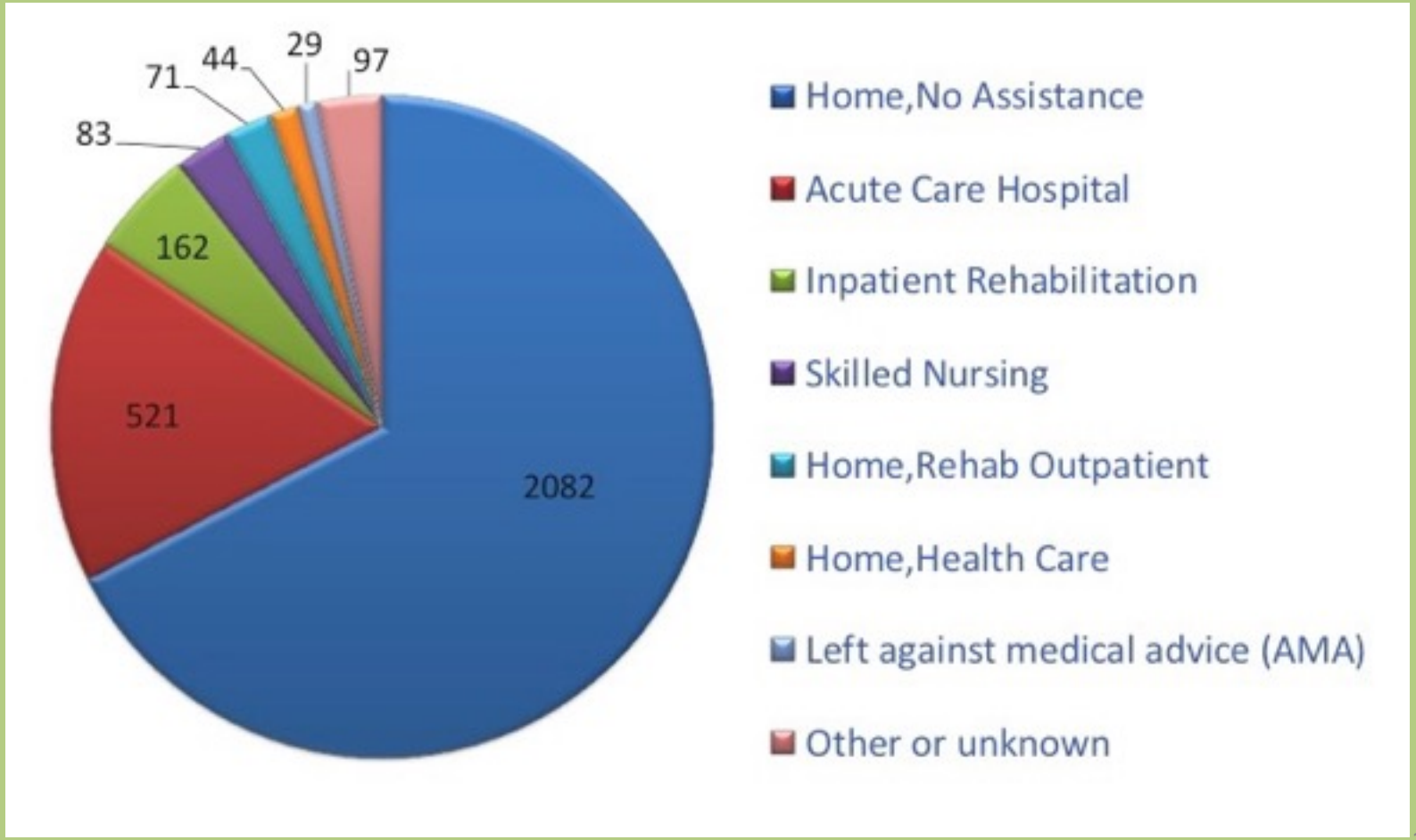


Myths and Misconceptions

- In the lower 48 and Alaska, most people with brain injury get treated in a medical facility until they are fully recovered

Patient destination at discharge

Non-fatal TBI Hospitalizations in Alaska
2004-2008



Brain Basics

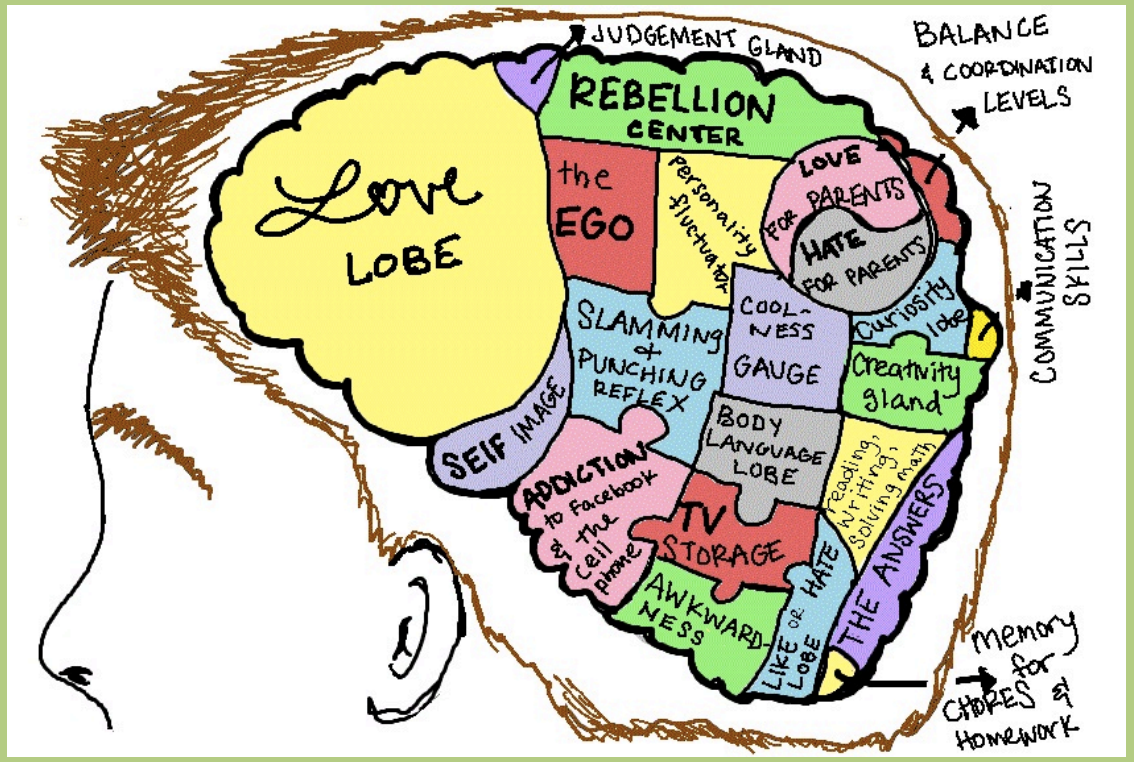
Brain Basics

Physically

- Reaches full size at age 12
- The brain is a big blob of jelly - 40% water and 60% fat
- Weighs about 3 pounds (1/2 the weight of your skin)
- Overall brain size is 10% larger in boys than girls during childhood
- Three-year-old brains are two-and-a-half times more active than adult brains
- 70,000 “thoughts” per day go through the average adult brain
- Lots of competition for space - “use it or loose it”
- Not fully mature until maybe 30-40 years of age (That prefrontal cortex just won’t grow up!)

Brain Basics

- A typical teenage brain



Brain Basics

Being a fat head is good

- 2/3 of the brain is specialized fat
- For Example: Myelin = 80% Fat, 20% protein
- 25% of your body's total cholesterol is found in your brain
- Omega-3 fatty acids (DHA and EPA from Fish or nuts/seeds)
- Omega-6 fatty acids (Vegetable oils)
- Higher levels of Omega-3's may be protective against brain injury
- Elders with higher levels of cholesterol do better cognitively

Brain Basics

The Brain is Electric

- Neurons are the things that make the sparks fly but they comprise only 10% of the brain
  - 100 Billion of these in the human brain
  - One dies every second (31 million per year)
  - New ones can grow (In the Hippocampus only)
- Up to 110,000 miles of nerve fibers in the brain
  - Diameter: .004 to .1 mm (About the size of a human hair or less)
  - Length: Fractions of inches to several feet (Head to toe)
- Insulation of these wires (axons) is very important and the more you think, the more you make
- Each axon connects with 1,000 to 10,000 other neurons, muscle cells, glands etc.

Brain Basics

Neuron Electron Micrograph

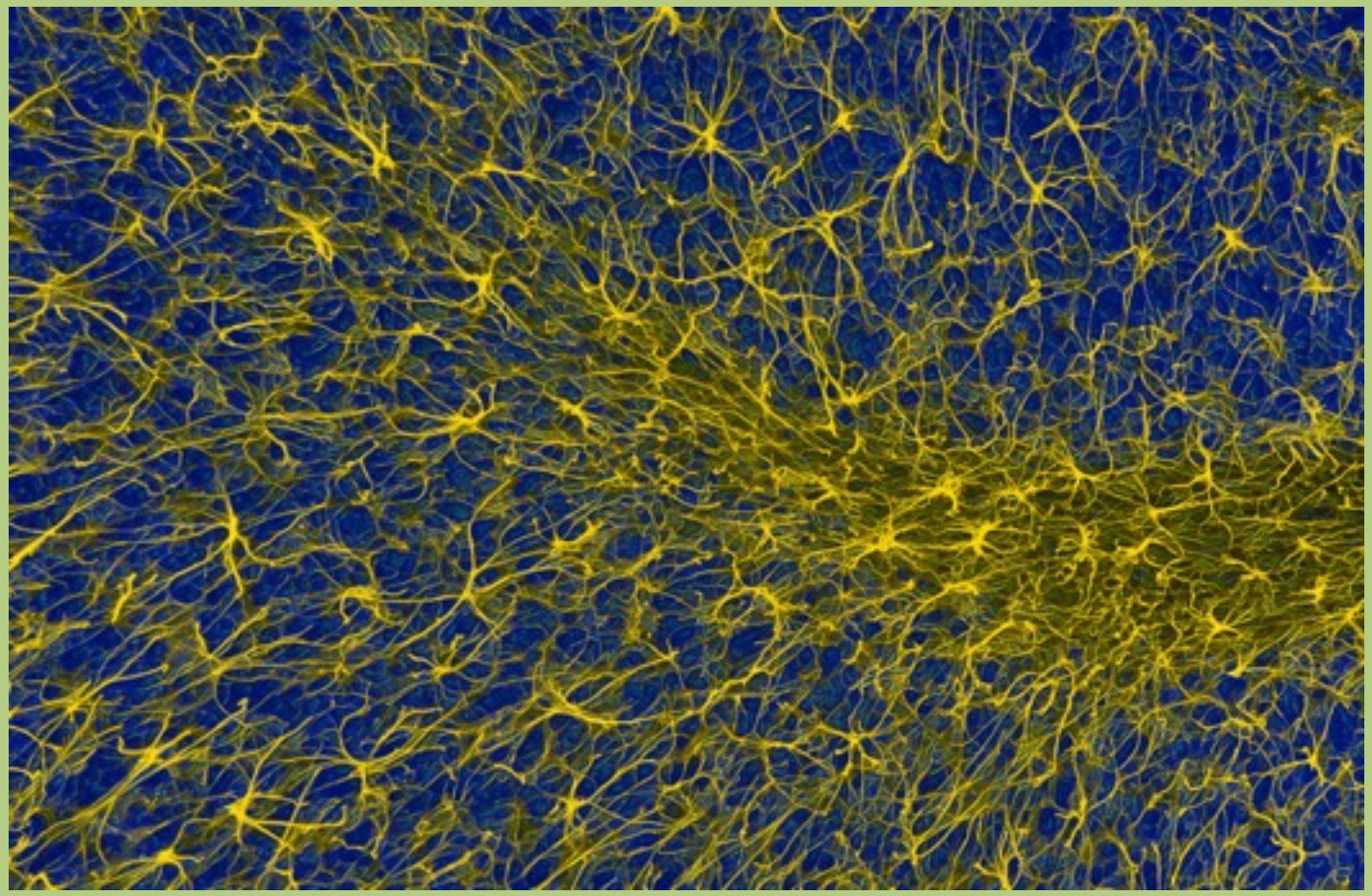
Brain Basics

Glial Cells

- 90 % of the brain is composed of the often ignored Glial cells
- Do not communicate electrically
- Clean up dead neurons
- Make myelin
- Physically/structurally support neurons
- Feed neurons
- Perform immune functions
- Some level of communication occurs in the form of calcium waves - is this the seat of consciousness and imagination?

Brain Basics

Glial Cells



Brain Basics

Neurotransmitters

- Chemical signals that combine with the electric
  - From both the Central and the Enteric Nervous system
  - Some neurotransmitters are famous
    - Serotonin
    - Dopamine
    - Norepinephrine
- Brain injury can damage production and reception of these chemicals
- Mood disorders like depression are very common after TBI - is this why?

Brain Basics

The Really Good News

Neuro-Plasticity Means We Can Re-connect!

Brain Basics

Neuro Plasticity

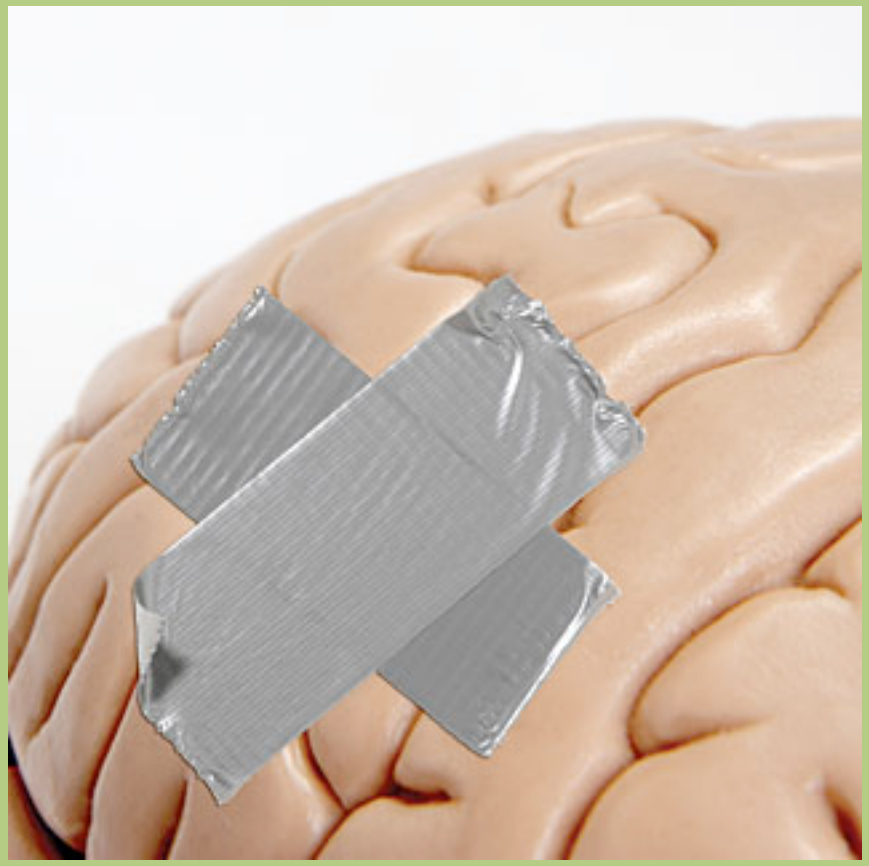
- It is good
  - Our brain's ability to reroute around damage is greater than we thought
  - Cannot grow new neurons in all cases, but can make new neural connections
  - The more we ask the brain to do what it used to, the more it will – ie constraint therapy
- It is bad
  - We can build super highways in our brain that lead to bad outcomes ie. addiction, obsessions and the like

Brain Basics

Neuro Plasticity

- To take advantage of Neuro-plasticity the dosing of treatment should be very high
  - The more therapy (demands on the brain to reorganize) the better
  - Different types are crucial – physical, cognitive, speech etc
  - Speech therapy, for example, might be needed 8-9 hrs per week
  - Everyone with a brain injury is different
- Timing is crucial
  - Crucial window for treatment is within 3-6 months after the injury but change happens after this too

How Brain Injury Happens



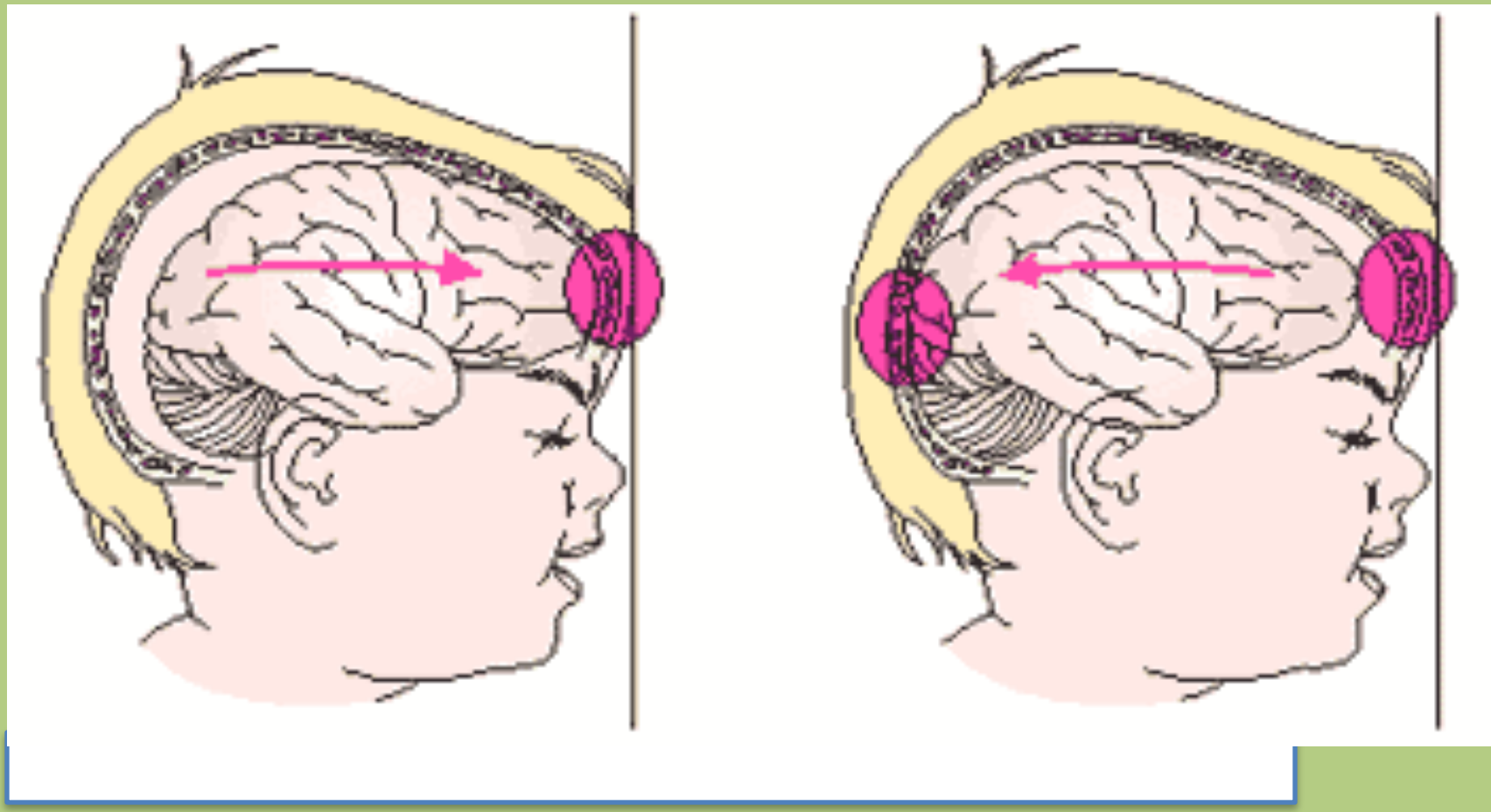
Brain Injury

The Shifty Brain

- The brain has no internal support
- The brain is easily moved about within the skull
- There are some sharp pokey bits in the skull
- Blood vessels and nerves exiting the skull can be severed or stretched in an impact

Brain Injury

The Shifty Brain

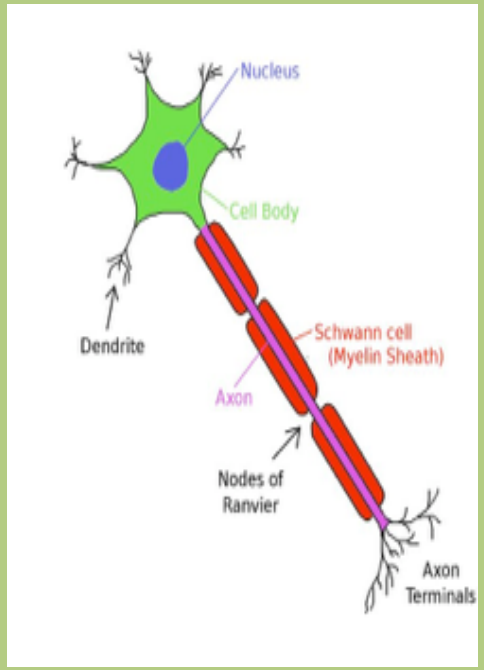


Coup - contrecoup

Brain Injury

Neuronal Damage

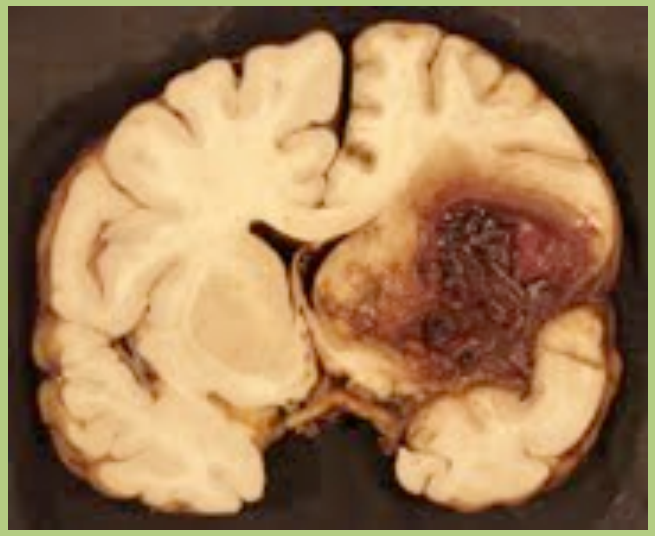
- Moving a Neuron a fraction of an inch = no communication
- Diffuse Axonal Injury –damage to the axon itself
- May take time to show up
- Not seen on most imaging

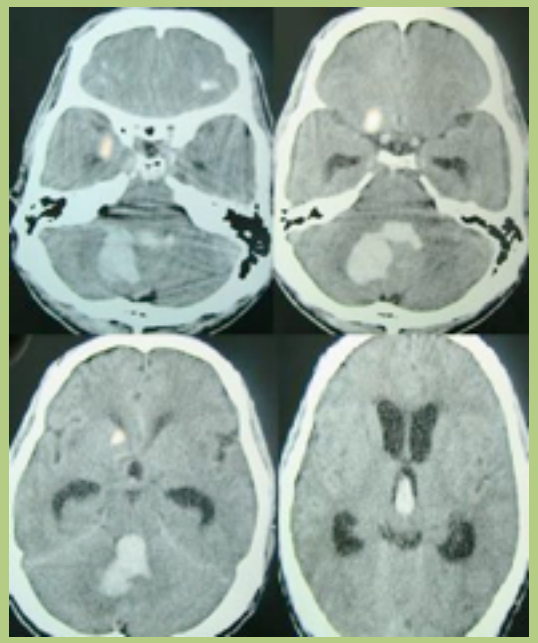


Brain Injury

Blood Vessel Damage

- Blood outside vessels is toxic to the brain
- Loss of blood supply starves cells
- Bleeding in the brain can compress the tissues





Brain Injury

Brain Swelling

- Many causes of swelling
  - Direct trauma
  - Blood is released into brain
  - Intrinsic immune system is activated
- Brain swelling compresses structures
  - Restricts blood flow
  - Compresses nerves
  - Moves neurons
  - May damage glial cells

Brain Injury

Loss of Oxygen

- 20% of our body's oxygen is earmarked for brain use
- Brains can survive without oxygen for 4-6 minutes
- Lack of oxygen for 5-10 minutes will cause "permanent" brain damage

Brain Injury

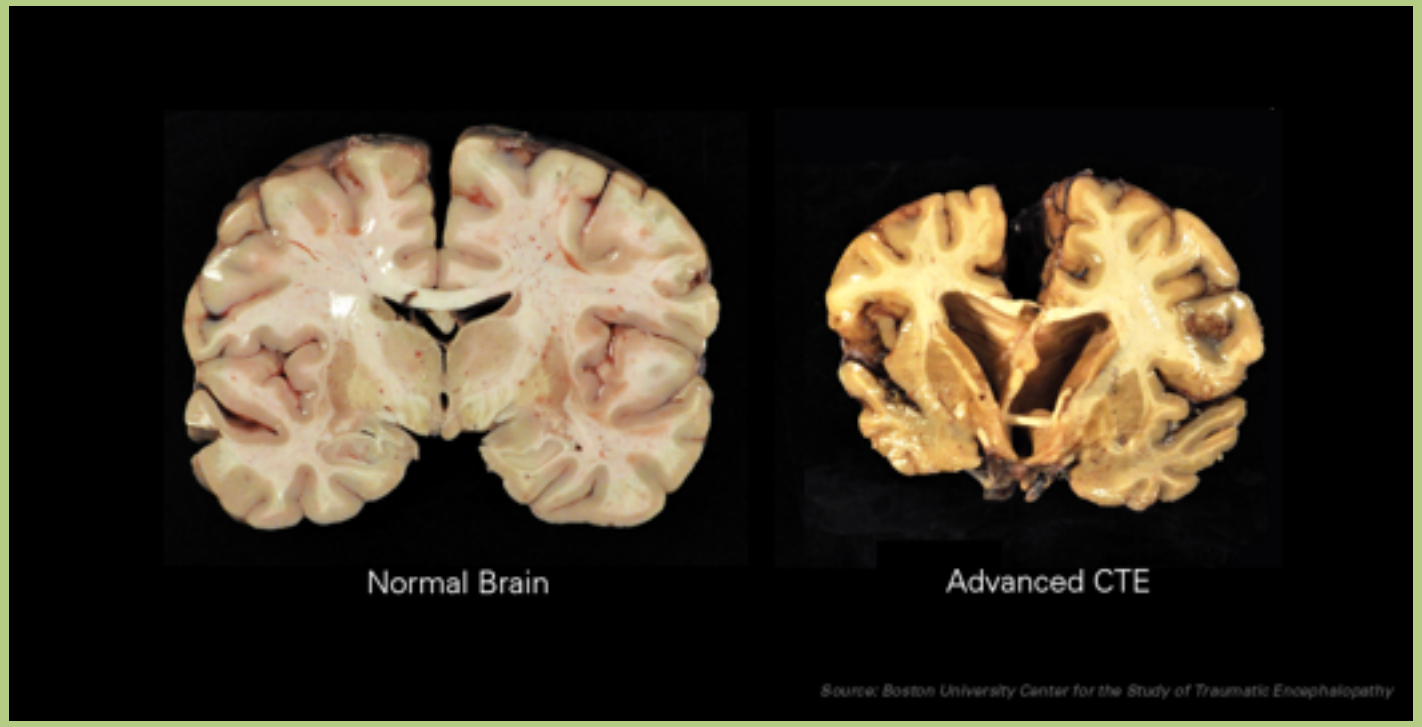
Chronic Traumatic Encephalopathy

- Over 87 former NFL players (95.6%) have been identified with CTE
- New studies show repeated brain injuries create neuronal changes
- Creates irreversible degenerative disease
- Leads to substance abuse, violence, erratic and unpredictable behavior
- Has been identified in a high school football player

Brain Injury

Chronic Traumatic Encephalopathy

- CTE has been identified in athletes in a number of sports:
  - Football, soccer, ice hockey, professional wrestling, stunt performing, bull riding, bicycle motocross, rodeo, baseball, boxing, mixed martial arts, rugby, cricket



Identifying a TBI

How do we know if something is wrong?

Brain Injury

Identifying a TBI

- Actually quite difficult
  - Especially when the damage is functional and not structural
  - Most brain damage is functional
  - Many victims may not know they have a brain injury
  - Symptoms may only show up weeks or years later
  - A Brain injury will look like many other things
    - Depression
    - PTSD
    - Anger problems
    - Substance abuse
    - Etc

Brain Injury

Identifying a TBI

- We have imperfect tools
  - Currently use subjective symptom based tools
  - Moving toward objective diagnostic tools
  - Screening as many folks as possible is an extremely important first step

Screening for Brain Injury

Screening for TBI

- Positive screening is not a diagnosis
- Positive screening means further evaluation needed
- Which tool to use?
  - SCAT 3 – for sports concussions (long)
  - Ohio State University TBI Screen (medium)
  - Rivermead Post-concussion Symptoms Questionnaire (short)

Treatment of Brain Injury

Treatment of Brain Injury

- The big ideas
  - Brain Injury is a chronic illness - it lasts a lifetime
  - People with brain injury, unlike people with other disabilities, can get better
  - Recovery from brain injury can be uneven
  - Early and intense treatment is the best

Treatment of Brain Injury

- Accommodation is often mistaken for treatment
- Accommodation teaches someone how to live with the disability
- Treatment focuses on removing the disability
- Usually some accommodation is necessary but treatment should always be the goal

Treatment of Brain Injury

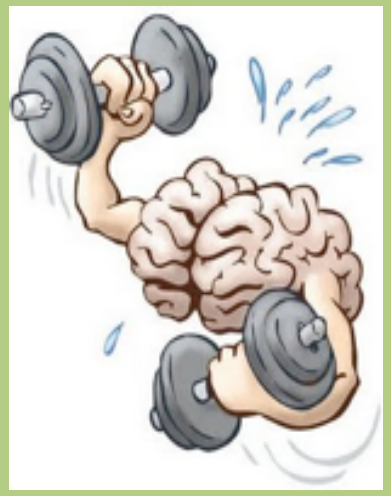
- Brain stuff is not black or white - it is largely grey (matter)
- Brain injury is a “developing disability”
- Injuries can manifest years later as the brain ages or is stressed
- Recovery can be uneven
- Kids recover faster but as they age, problems start to show up

Treatment of Brain Injury

- Women suffer more mild TBI
- Most damage regardless of area impacted is in the frontal/ temporal lobes
- Due to better prevention, fewer die after a TBI but we have a lot more impaired survivors

Treatment of Brain Injury

- Recovery is longer if:
  - The brain is not fully developed ie in kids.
  - Female
  - History of prior concussion
  - Prior history of migraines
  - ADD or Learning Disability
  - Substance abuse
  - Physical exertion immediately following the injury



Treatment of Brain Injury

- Acute → Subacute → Chronic
- Acute treatment is pretty straight forward for more severe injury
- Need for surgery does not imply worse outcome
- Key treatment concepts:
  - Reduce inflammation
  - Reduce bleeding
  - Reduce oxidative damage
  - Encourage neuronal repair
  - Make connections

Treatment of Brain Injury

- Post acute and mild TBI treatment is more difficult
- All treatment must be individualized
- Treatment may be life-long - It is the gift that keeps on taking
- Always remember that brain injury is a chronic disease

Treatment of Brain Injury

- The best model of treatment is a community based model
- The best approach is person-centered

Treatment of Brain Injury

- It takes a village:
  - Speech therapy, OT, PT
  - Cognitive therapy
  - Modified school or work
  - Neurofeedback
  - Sleep and stress management – REST
  - Behavior management
  - Hormone and Neurotransmitter testing/balancing
  - Vocational rehabilitation
  - Treatment for addiction
  - Case management/Care Coordination
  - Anything else the individual needs to get better

Treatment of Brain Injury

- In-patient
  - Most common
  - Consumer lives in facility other than home
  - Therapies, care, meals, etc. occur in facility
  - Family & friends “visit”
  - Consumer is removed from family & society
  - Costly to funders
  - Does serve a temporary purpose

Treatment of Brain Injury

- Community based
  - Back in society/in community.
  - Live in own home/with family, etc.
  - Care and therapies delivered at home
  - Requires Waiver support/funding
  - Costs less than inpatient
  - Focus is on what consumer wants to accomplish

Treatment of Brain Injury

Different Models of Care

In-Patient and not person-centered

- Loss of dignity
- Medical team is center
- Loss of empowerment
- Make few decisions
- Loss of control over life, time and money
- Institutional based activities
- Loss of motivation
- Depression

Community-based and person-centered

- Retain dignity
- Consumer centered
- Empowered
- Make decisions
- Keep control over life, time,money
- Real life activities
- Real life motivation
- Less depression

Treatment of Brain Injury

- When working with people with Brain Injury always keep these two things in mind:
  - Always ask: “How are you going to do this when we’re not here any more?”
  - Your goal: Work yourself out of a job!

Working With Brain Injury

Working With Brain Injury

Everything Changes

- Cognitive
  - Memory
  - Learning
  - Attention
- Emotional/Behavioral
  - Anger
  - Depression
  - Fear
  - Frustration

Working With Brain Injury

Everything Changes

- Physical
  - Disabled
  - Weak/easily fatigued
- Developmental (if children)
  - Miss milestones of development
  - Fall further and further behind
- Role change
  - Cannot do the stereotypical things
  - Loss of self
  - Cannot care for others
  - Dependency

Working With Brain Injury

Everything Changes

- Loss of social connections
  - Others feel uncomfortable with them
  - The injured person may be difficult to be around
  - There may be dangerous behavior
  - Perhaps no or poor speech
  - They may fail to recognize those close to them

Working With Brain Injury

Challenges

- Common struggles after a brain injury
  - Attention
  - Processing speed
  - Memory
  - Executive functioning

Working With Brain Injury

Change The Environment

- Change the classroom/workspace/home/hospital
  - Move the person to reduce distraction
  - Turn down the light and the noise
- Change the pace
  - Frequent breaks
  - Slow the pace of instruction/therapy/conversation
  - Repeat yourself
  - Write everything down for them – maybe twice!
  - Provide advance warning
  - Memory systems - organizers, calendars

Working With Brain Injury

Change The Way You Think

- Treat them with respect
- Always speak to them and not as if they are not in the room (The Key to Person-Centered care)
- Be positive always
- Be patient – brain injury is a chronic disease
- Be kind and forgiving but keep your boundaries
- Be consistent and transparent
- Laugh – a lot!
- Don’t settle and don’t let them either – strive for treatment not just accommodation

Questions?

Dr. Adam Grove, ND

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Who Are You Going To Call?

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